

U.S. EPA Heat Island Reduction Program

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ENERGY STAR Requirements for Roofing Products

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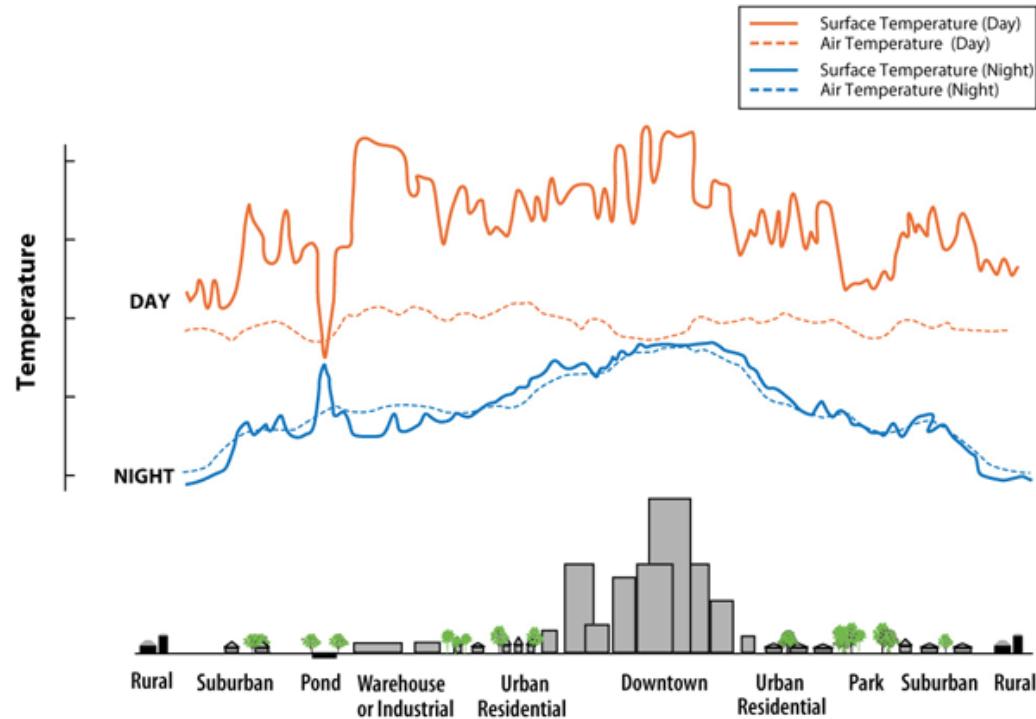
The Heat Island Effect

Definition

- Micro-scale temperature differences between urban and rural areas
- Urban areas can be 9 – 27 ° F higher than rural areas

Causes

- Reduced vegetation
- Materials used to build urban infrastructure
- Urban geometry



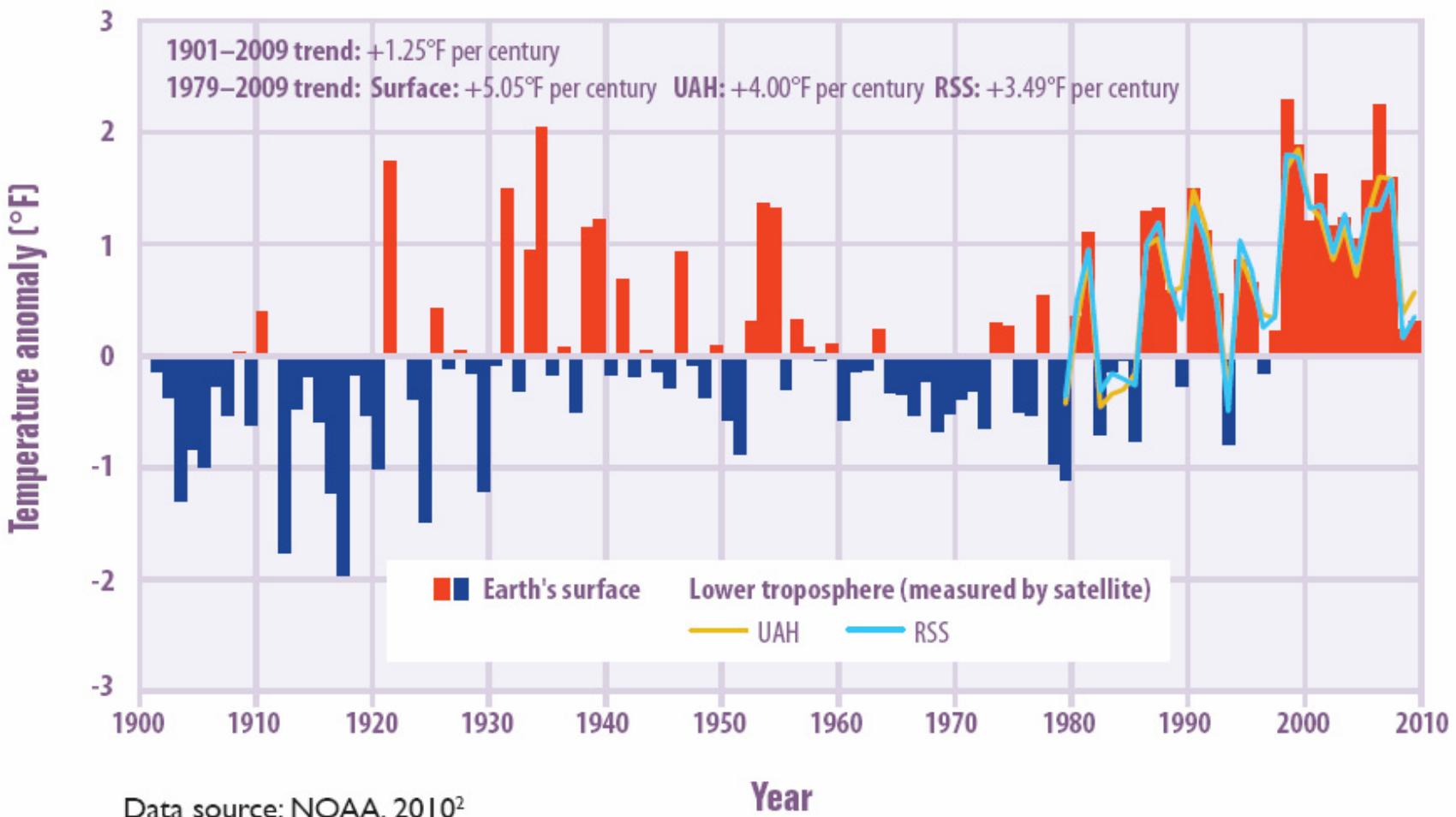


Heat Island Impacts

- **Air Quality & Greenhouse Gas (GHG) Emissions**
 - ▶ Ozone formation
 - ▶ Increased air pollution
 - ▶ Increased GHG emissions
- **Increased Energy Use**
 - ▶ 5 – 10 % of electricity demand is to cool heat islands effects
 - ▶ 1.5 – 2.0% E demand ↑ for every 1 °F ↑ in the summer
 - ▶ Longer peak periods; pressure on E grid; brownouts, blackouts
- **Water Quality**
 - ▶ Warmer water runoff = ecological shock in waterways
 - ▶ Increased water runoff = more pollutants in waterways
- **Human Health**
 - ▶ Respiratory difficulties
 - ▶ Heat cramps
 - ▶ Heat exhaustion
 - ▶ Non-fatal heat stroke/sun stroke
 - ▶ Heat related mortality



Trends in U.S and Global Temperatures





Mitigation Strategies

- Communities can take medium to long-term action through community planning and infrastructure to reduce urban heat islands and achieve multiple benefits.
 - Trees and Vegetation
 - Green Roofs
 - Cool Roofs
 - Cool Pavements

Mitigation Strategy

Cool Roofs



- Cool roofing products are made of highly reflective and emissive materials that can remain approximately 50 to 60°F (28-33°C) cooler than traditional materials during peak summer weather.

- Low-sloped roofs
 - Coatings
 - Single ply membrane
- Steep-sloped roofs
 - Asphalt shingles
 - Metal roofing
 - Tiles
 - Shakes



U.S. EPA Heat Island Reduction Program



Program Objective

- Communicate and stakeholder build capacity heat island science, impacts, and programmatic opportunities
- Encourage heat island mitigation implementation through voluntary and regulatory programs and policies

Heat Island Community - Stakeholders

- Policymakers, program designers and program implementers (e.g., cities, NGOs)
- Researchers/academia
- Industry, developers of new technology
- General public (e.g., K-12 students and teachers, coaches)
- Media

Topics of Interest

- Heat island science, modeling, and measurement
- Innovative mitigation technologies in areas such as cool pavements, cool roofs, green roofs, and trees and vegetation
- Implementation case studies describing program design, challenges, stakeholder involvement, funding streams



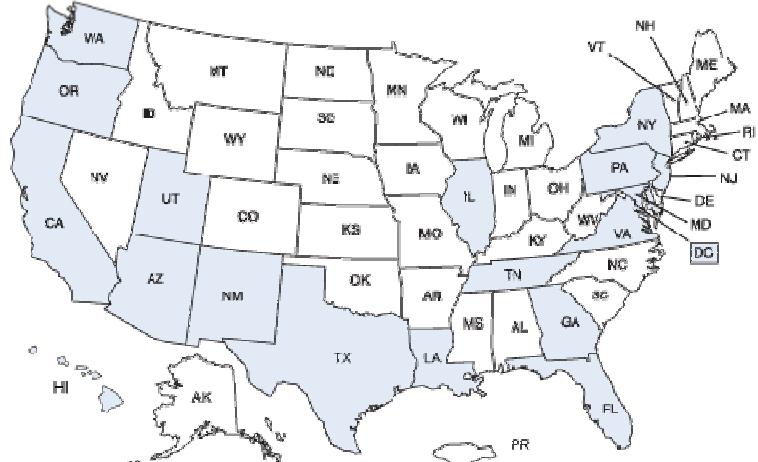
Heat Island Program Resources

- **Website**, features include basic information on heat island topics, calendar of events, heat island newsroom, science corner and a variety of resources, <http://www.epa.gov/heatislands/>
- **Database**, provides info on more than 75 local and statewide initiatives to reduce heat islands and achieve related benefits
- **Compendium of Strategies: Reducing Urban Heat Islands**, provides an overview of latest science, mitigation strategies, case studies, and recommendations for additional resources, <http://www.epa.gov/heatislands/resources/compendium.htm>
- **Webcasts**, regular online meetings cover topics such as local/regional urban heat island programs, new scientific findings, and upcoming meetings www.epa.gov/heatislands/resources/webcasts.htm
- **MIST** (Mitigation Impact Screening Tool), tool that estimates the impacts of the urban air temperature, ozone, and energy consumption
- **Listserv**, to sign up, email EPA_heatisland_subscribe@icfi.com



Examples for our Database?

- Actions listed in the database are some efforts underway to cool communities while saving energy, reducing greenhouse gas emissions and improving air quality
- Each entry in the database includes a description of the activity, its current status, and a link to a website (if available) for more information.
- The database can be searched by:
 - Clicking on U.S. map (diagram on right)
 - State and locality
 - Initiative Type
 - Strategy



http://yosemite.epa.gov/gw/statepolicyactions.nsf/webpages/HIRI_Initiatives.html

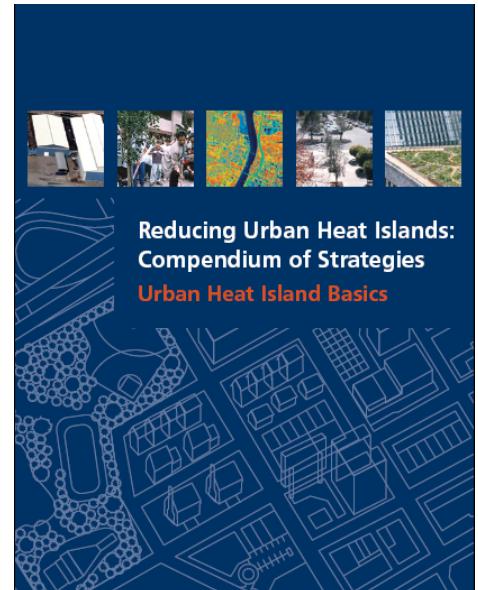


Compendium

Reducing Urban Heat Islands: Compendium of Strategies

- Provides an overview of latest science, mitigation strategies, case studies, and recommendations for additional resources
- Chapters
 - Heat Island Basics
 - Trees and Vegetation
 - Green Roofs
 - Cool Roofs
 - Cool Pavements
 - Heat Island Reduction Activities

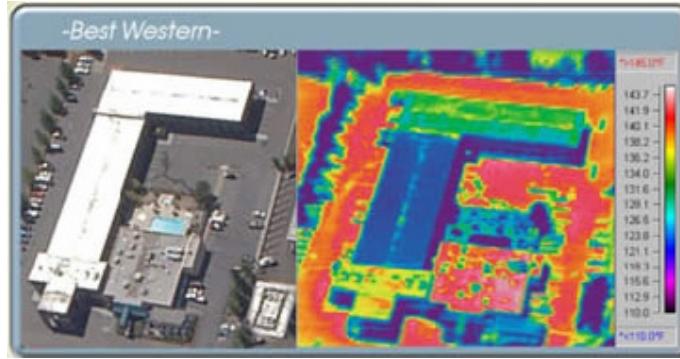
www.epa.gov/heatislands/resources/compendium.htm



Compendium of Strategies: Cool Roofs Chapter



- Provides detailed information that mitigation program organizers can use to understand, plan, and implement cool roofing projects and programs.
- Chapter discusses:
 - Roofing properties that help to mitigate urban heat
 - Types of cool roofing
 - Benefits and costs
 - Measurement and certification of cool roof products
 - Installation and maintenance of cool roofs
 - Tools and resources



Courtesy of Kelly Roofing



Contact Info

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U.S. EPA Heat Island Reduction Program Website

- www.epa.gov/heatislands

Sign-up for Heat Island Reduction Program Email Announcements

- <http://www.epa.gov/heatisld/admin/listserv.htm>